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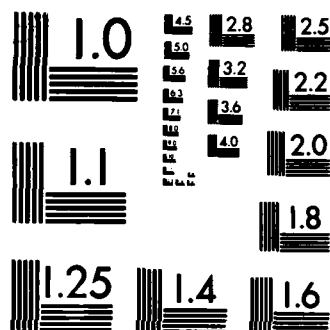
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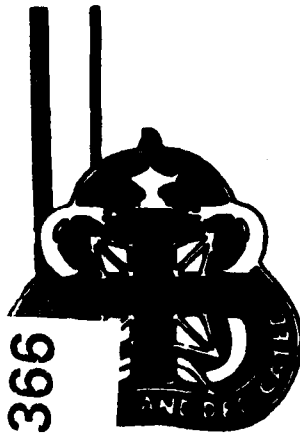
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EVALUATION OF THE MEDICAL AND DENTAL PORTIONS
OF THE SOLDIER DATA TAG SYSTEM

EXECUTIVE SUMMARY

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19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Soldier Data Tag System, Medical, Dental, Medical Records, Inpatient Records, Outpatient Records, Computer, Evaluation		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) In 1981, Soldier Support Center (SSC) was directed to evaluate microchip technology for use in individual soldier data cards. This directive led to the Soldier Data Tag System (SDTS), which was tested at Fort Benjamin Harrison, IN. The SDTS consisted of an individual microchip soldier data tag (SDT) containing personnel, financial, medical and dental records. A microprocessor-based reader-writer, a data base, and the software to read and/or update the tags, as well as to search the data base were also components of the SDTS.		

The objectives of this study were: (1) From the provider perspective, evaluate the acceptability, comprehensiveness, and flexibility of the medical and dental record portion of the SDTS; (2) From the administrative and legal perspectives, evaluate the acceptability, comprehensiveness, and flexibility of the medical and dental portions of the SDTS; (3) To evaluate AMEDD personnel requirements to operate the SDTS; (4) To evaluate the equipment requirements to operate the system; (5) To evaluate the practicality of an implemented system; (6) To evaluate the SDTS both as a replacement for the current medical and dental records and associated data systems, and as a needed and defensible supplement to the current medical and dental records and associated data systems. This study was conducted through a literature review and through consultations with subject matter experts. *Keywords: 18 19*

The study reached the following conclusions: (1) An automated medical record is an item which has become fully operational in the civilian sector. The SDTS can be a valuable source of medical information in both the garrison and the field; (2) From an administrative point of view, the automated medical or dental record would be acceptable, if the individual care provider and MTF were identified. For signatures and detailed narratives, a note in the automated record which would locate the paper would suffice; (3) The AMEDD personnel impacts of the SDTS can be placed into two categories, those related to the initial entry of the data into the system, and those related to system updates. The initial entry of data will require 15 to 60 minutes of time per record. The updates of an individual record could be accomplished without additional workload if these requirements were met by data gathered for other patient data systems; (4) If the SDTS is operated in concert with an ambulatory data capture system, the Theater Army Medical Management Information System (TAMMIS), and the Individual Patient Data System (IPDS), the equipment requirements unique to this program would be acceptable, as most are planned to support other programs. Interoperability with existing or proposed systems will be difficult at OCONUS MTFs due to the lack of automation at these facilities; (5) If implemented as described herein, the ambulatory data capture to support the SDTS would cost \$0.08 per encounter, with costs shared with other programs. The inpatient data input would depend on costs already supported by biometric data requirements. These costs are reasonable in light of the benefits to be gained; (6) The SDTS will not replace the paper health record in the foreseeable future. It is fully justified, if implemented in concert with the other programs. The development of an automated system to collect dental data for the SDTS may not be justified at this time. An arrangement for the SDT Health Record was suggested.

This study recommends that: (1) The ambulatory and the inpatient data base portions of the SDTS medical data base be implemented; (2) The data tag portion of the SDTS medical record be implemented for active duty Army personnel; (3) The SDTS and the SDT medical record implementation be extended OCONUS upon installation of suitable patient data systems in these facilities; (4) Further study be given to the requirement to automate some portion of the dental record; (5) Appropriate liaison be established to insure that the needs of the AMEDD are met. A Final Report is available as Part B of this report.

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Introduction

In December 1981, the U.S. Army Soldier Support Center (SSC) was directed by the Deputy Chief of Staff for Personnel, Headquarters, Department of the Army, to evaluate microchip technology for use in individual soldier data cards. This directive led to the Soldier Data Tag System (SDTS), which was recently tested at Fort Benjamin Harrison, IN by the TRADOC Combined Arms Test Activity. The tested SDTS consisted of an individual microchip soldier data tag (SDT) containing battlefield personnel, financial, medical and dental records. A microprocessor-based reader-writer, a data base which duplicates the information found on the tags, and the software to read and/or update the tags, as well as to search the data base were also components of the SDTS.

The SDT currently being considered contains 64K of electronically erasable programable read only memory and associated circuitry. These are embedded in a tag of durable material roughly 1 3/4" by 3/4" by 1/8" in size. The current tags and tag interfaces are commercially available devices, as are the microcomputers. The tag is read from, and written to, using a microcomputer equipped with an SDT interface. The personnel, finance, and medical microcomputers were, in the test system, linked to form a distributed data base. However, users were able to access only those portions of the data base relevant to their functional area. The goals of the current SDTS were (1) to demonstrate the feasibility and utility of the SDTS in the personnel, financial, and medical and dental areas, and (2) to reduce the technical uncertainties involved in using such a

system within the military environment. This system represents a state-of-the-art application of computer technology. Ultimately, it is hoped that the SDTS will reduce the number of support personnel involved in records handling, eliminate paper records, and improve support in both wartime and peacetime. Because most, if not all, of the information in the data base is duplicated on the SDT, the system enjoys a high degree of redundancy. The civilian experience with records of this type indicates that they are entirely satisfactory as records once the overall system is fully developed.

Current doctrine does not permit paper medical, dental, and other records to be taken onto the battlefield. Thus, wounded soldiers must now be treated without reference to their personal medical or dental records. This lack of information could hinder the treatment of a casualty, and could be even more of a problem in a mass casualty situation. Indeed, rapid access to the medical and dental records is just as vital in a garrison emergency situation, or when emergency treatment is sought in a location where the paper records are not available, as is the case in a tactical setting. While a fully functioning system of this type would appear to be useful, there are a number of questions about the feasibility of the SDTS, or any similar system, as a medical or dental record.

Objectives

The objectives of this study were as follows:

1. From the provider perspective, evaluate the acceptability, comprehensiveness, and flexibility of the medical and dental

record portion of the SDTS in both field and garrison settings.

2. From the administrative and legal perspectives, e.g., the American Hospital Association and the Joint Commission on Accreditation of Hospitals, evaluate the acceptability, comprehensiveness, and flexibility of the medical and dental portions of the SDTS.
3. Evaluate AMEDD personnel requirements to operate the SDTS in terms of skill level and number required.
4. Evaluate the equipment requirements to operate the system. The ratio of SDTS reader-writers to health care providers will be estimated.
5. Evaluate the practicality of an implemented system. Would AMEDD-wide implementation of the SDTS result in a system which is too complex and expensive to be practical?
6. Evaluate the SDTS both as a replacement for the current medical and dental records and associated data systems, and as a needed and defensible supplement to the current medical and dental records and associated data systems.

Method

This study was conducted through a literature review and through consultations with subject matter experts. The literature review was directed towards determining the general acceptability, comprehensiveness, and flexibility of automated medical and dental records systems, the SDTS' standing relative to these systems, and the requirements for an automated medical and dental records system. The consultations were with HCSCIA personnel, Patient Administration Systems and Biostatistics Activity personnel, Headquarters, Health Services Command

consultants, Academy of Health Sciences specialists, health care providers assigned to Brooke Army Medical Center, and personnel at the Soldier Support Center who were involved in the SDTS test. These consultations were used to evaluate the SDTS from the provider, the administrative, and the legal perspectives, to evaluate the requirements to implement and maintain the system, and to evaluate the practicality and overall utility of the system.

Findings and Conclusions

1. The automated medical record is an item of technology which has become fully operational in the civilian sector. The SDTS, modified as noted above, can be a valuable source of medical information in both the garrison and the field medical systems. There is presently no basis of civilian experience in automated dental records from which to draw.
2. From an administrative point of view, the automated medical or dental record would be acceptable if it were possible to track back to the individual care provider and MTF. In the case of signatures and detailed narrative information, a note in the automated record which would allow the paper record to be recovered would be adequate. The SDTS system, if implemented as described herein, would improve ambulatory quality assurance efforts and the quality of patient care by upgrading the medical and dental information available within a medical or dental treatment facility.
3. The AMEDD personnel impacts of the SDTS can be placed into two categories, those related to the initial entry of the data

into the system, and those related to system updates. The initial entry of medical data will require 15 to 60 minutes per record, depending on complexity. The updates of an individual record could, however, be accomplished without additional workload if these requirements were met through the use of data gathered by other, suitably modified, ambulatory and inpatient data systems. These other systems would, however, have to be supported with adequate personnel.

4. If the SDTS is operated in concert with both a computerized ambulatory data capture system and a modified IPDS, the equipment requirements would be as follows: one optical mark reader and associated microcomputer with SDTS receptacle per clinic or group of colocated clinics, one master optical mark reader and associated microcomputer per medical treatment facility, and access to the IPDS inpatient record at one site in each facility, along with an SDTS receptacle and a suitable loading device. All of this equipment, with the exception of the SDTS receptacles and the clinic based optical mark readers and microcomputers, would be planned to support other programs. Interoperability with existing or proposed systems will be difficult at OCONUS MTFs due to the lack of automation at these facilities.

5. If implemented as described herein, the ambulatory data capture to support the SDTS would cost \$0.08 per encounter, and would be shared with other programs. The inpatient data input would depend on costs already supported by biometric data requirements. These costs appear to be reasonable in light of the benefits to be gained.

6. The SDTS will not replace the paper health record for garrison purposes for the foreseeable future. It will be most manageable for the AMEDD if implemented in concert with the programs described elsewhere in this report. An inpatient episode would be recorded as an abstract of the present IPDS record, while an outpatient record would be based on an abstract of a computerized ambulatory data capture system record. The development of an automated system to collect dental data should be pursued, although implementation to support the SDTS alone may not be justified.

7. The authors feel that the SDT medical and dental record should be arranged as follows:

- Menu
- Emergency Data
- Administrative Data
- Physical Data
- Medical Record
- Spectacle Prescription
- Immunizations
- Dental Record
- Combat and Emergency Record
- Remarks

These items are more fully described in the Annexes found in Part B of this report. Suggestions for outpatient and inpatient medical records for the SDTS are found in Tables 1 and 2.

Recommendations

1. That a computerized ambulatory data capture system and the inpatient data base to support the SDTS be implemented, as outlined above.
2. That the Soldier Data Tag portion of the SDTS medical record be implemented for active duty Army personnel when the ambulatory and inpatient data capture systems are in place.

3. That the SDTS and the SDT medical record implementation be extended to OCONUS MTFs upon installation of suitable patient data systems in these facilities.
4. That an automated dental data capture system be designed, and that issues related to its implementation be studied.
5. That liaison be established with the Soldier Support Center to insure that the implemented SDTS meets the information needs of the AMEDD.
6. That liaison be established with the Environmental Hygiene Agency to rationalize the data collection requirements of the SDTS, the Performance Measurement Study, and the OHMIS.
7. That liaison be established with the TAMMIS Project Office, Academy of Health Sciences, to coordinate the requirements of SDTS and TAMMIS.
8. That liaison be established with the Triservice Medical Information Systems (TRIMIS) Program Office through the TRIMIS Army Project Office to insure that the pending CHCS and the Quality Assurance System are capable of supporting the implemented SDTS.

Table 1

Suggested Ambulatory Encounter Record

ITEM	FIELD TYPE & FILL	WIDTH	TOTAL WIDTH
Date	Numeric, DDMMYY	6	6
MTF Code (IPDS)	Numeric	4	4
UCA Outpatient Clinic	Alphanumeric	3	3
#1 Provider	Alphanumeric	5	5
#2 Provider	Alphanumeric	5	5
Type of Visit	Alphanumeric, Routine Complex Acute	1	1
Disposition	Numeric, Coded 11 Choices	2	2
Laboratory	Alphanumeric - Y/N	1	1
Prescriptions	Alphanumeric - Y/N	1	1
XRays	Alphanumeric - Y/N	1	1
Other	Alphanumeric - Y/N	1	1
Procedures*	Numeric, 3 Fields	5	15
Diagnoses	Alphanumeric, 2 Fields	5	10

TOTAL RECORD WIDTH.....55

This analysis assumes that all of the patient demographic data are stored in a separate administrative data section. This data element selection is based on previous studies.

*If coded in ICD-9-CM the width of these fields would be 4 columns. If coded in CPT, the field width would be 5 columns.

Table 2

Suggested Inpatient Record

ITEM	FIELD TYPE & FILL	WIDTH	TOTAL WIDTH
Reporting MTF Code	Numeric	4	4
Register Number	Numeric	7	7
Type of Case	Alphanumeric	1	1
Inpatient Clinic Svc.	Alphanumeric	3	3
#1 Provider*	Alphanumeric	5	5
#2 Provider*	Alphanumeric	5	5
Disposition	Alphanumeric	1	1
Date this Admission	Numeric	6	6
Total Sick Days	Numeric	3	3
Cause of Injury	Numeric	3	3
Diagnoses**	Alphanumeric, 3 Fields	7	21
Procedures**	Alphanumeric 3 Fields	6	18

TOTAL RECORD WIDTH.....77

This analysis assumes that all of the patient demographic data are stored in a separate administrative data section.

* This field would be added to the IPDS record.

** These fields would be modified to accommodate the ICD-9-CM codes. An examination of IPDS data suggests that the proposed combination of 3 diagnosis fields and 3 procedure fields will cover 93.6% of active duty dispositions, including 94.5% of active duty patients discharged to duty, and 86.6% of all dispositions, based on data reported from Health Services Command facilities for the period September 1983 to August 1984.

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